

ART 34 AMDT

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Claims

1. A substrate on which a security document is to be printed comprising a plurality of identification features in the surface thereof, which when illuminated and imaged by scanning, produce image data signals in the output of a photoelectric device characterised in that:

(i) the contrast between the identification features and the remainder of the substrate surface is such that image data signals corresponding to said features are substantially indistinguishable from image data signals relating to the remainder of the substrate surface and/or from background noise signals in the output of the photoelectric device and are thereby indistinguishable by eye; and

(ii) the features repeat at intervals over at least some of the surface area of the substrate, whereby upon validation time or position of signals relating to each feature will bear at least one fixed relationship to signals relating to other of said features, whereby a computing device supplied with the image data signals can be programmed to identify whether feature signals bearing the said at least one fixed relationship are present in the data, to assist in identifying the imaged document.

2. A substrate according to claim 1, wherein the identification features are repeated at regular intervals.

3. A substrate according to claim 1 or claim 2, wherein each of the identification features is similar in character to each of the other features in the said surface.

4. A substrate according to any of claims 1 to 3, wherein the spacing of identification features is such as to be constant in one direction only or varied according to a special, known pattern, and similar or different regular spacings are selected for features in

another direction bearing a particular spacial relationship relative to the first said direction, for example perpendicular to said one direction.

5. A substrate according to any one of claims 1 to 4, wherein the features are arranged in a 2D matrix in the substrate surface.

6. A substrate according to claim 5, having a secondary encoding comprising a variation introduced into the matrix, such as by omitting features from particular positions in such a regular matrix.

7. A substrate according to claim 5, wherein the matrix comprises features having two distinctive types of characteristics, the features of one type being located at one set of positions in the matrix, and the features of the other type being located at other positions in the matrix.

8. A substrate according to any one of claims 1 to 7, wherein the identification feature encoded in the surface provides a primary encoding which will not appear in the electrostatic image of a photocopier.

9. A substrate according to claim 8, wherein the identification feature encoding is in the form of a repeating pattern.

10. A substrate according to claim 8 or claim 9, wherein the identification feature encoding comprises an embossing with inkless intaglio or an embossing of the surface by calendaring during manufacture of the substrate.

11. A substrate according to any one of claims 1 to 10, wherein two or more different encoding techniques are combined in the substrate.

12. A substrate according to claim 11, wherein the identification features are impressed in the surface of a substrate onto which a security document is to be printed, comprising

indentations and/or grooves in accordance with a first pattern which contains encoded therein a second pattern, thereby to enable a security document printed on such a substrate to be identified by subjecting image data signals obtained from scanning the document to an appropriate mathematical algorithm to determine whether the second pattern can be found in image data signals relating to the first pattern.

13. A substrate according to any one of claims 1 to 12, wherein the pattern is encoded to produce multiple iterations of a code on the substrate.

14. A substrate according to any one of claims 1 to 13, wherein the encoded pattern extends over selected areas which align with particular printed areas of the substrate.

15. A substrate according to claim 14, wherein the printed areas are such as to enhance the detection of the substrate surface variation during scanning and conversion of the image into image data signals.

16. A surface treated substrate in accordance with any one of claims 1 to 15, having any lighter and darker regions visible in the surface of a treated sheet of substrate when illuminated for scanning, but not visible to the eye.

17. A substrate according to claim 16, in which the identification features are embossed during its manufacture.

~~18. A substrate according to claim 16, comprising paper or plastics material mixed with a resin or lacquer or other material to provide a smooth surface for printing, and an encoded structure in the surface such that the actual surface is sufficiently smooth to accept printing ink to enable a security document to be printed thereon, but at the same time contains a fine pattern of less smooth regions, which are less receptive of printing ink.~~

18. A substrate according to claim 16, comprising paper or plastics material mixed with a resin or lacquer or other material to provide a smooth surface for printing, and an encoded structure in the surface such that the actual surface is sufficiently smooth to accept printing ink to enable a security document to be printed thereon, but at the same time contains a fine pattern of less smooth regions, which are less receptive of printing ink.

19. A substrate according to claim 16 wherein selected regions describe a repeat identification pattern by being impregnated with a fluid such as a resin, or lacquer, such that the optical absorption or reflectance characteristics or optical density of the substrate is altered sufficiently as between impregnated and non-impregnated areas as to be discernable under incident light.

20. A substrate according to claim 16, in which the surface is etched as by a laser beam, so as to produce cavities or grooves in the surface to be printed (or awaiting printing).

21. A substrate according to claim 16, comprising watermarking to vary the thickness and/or texture of a substrate, which variations can be rendered visible under incident light and form the primary and/or secondary encoding.

22. A security document substrate adapted to be identifiable as such by having detectable surface features therein according to any of claims 1 to 21, to enable identification as aforesaid.

23. A security document when printed on a substrate as claimed in any of claims 1 to 22.

24. A method of verification of a security document according to claim 22 or claim 23, wherein in a first step of verification a scanning process is employed to convert the image of the surface of the substrate of the document into image data signals for controlling a printing process, and when surface encoding is detected, a second step of verification is introduced by subjecting the image data signals to an appropriate algorithm, said second

step of verification, if failing, serving to downgrade or inhibit the printing process so as to prevent reproduction of the document, or at least a good quality reproduction thereof.

25. A method of verifying whether a document is a security document wherein a scanning process converts the image into image data signals for the subsequent control of a printing process and if the document is verified as a security document, the subsequent printing process is downgraded or inhibited to prevent a good quality reproduction of the document being reproduced.

Year	Country	Population (millions)	Urban population (millions)	Urban population (%)	Population growth rate (%)	Urban population growth rate (%)	Population density (per sq km)	Urban population density (per sq km)
1970	USA	205	115	56	1.3	1.5	33	115
1975	USA	220	125	57	1.4	1.6	35	125
1980	USA	230	135	59	1.5	1.7	37	135
1985	USA	240	145	60	1.6	1.8	39	145
1990	USA	250	155	62	1.7	1.9	41	155
1995	USA	260	165	63	1.8	2.0	43	165
2000	USA	270	175	65	1.9	2.1	45	175
2005	USA	280	185	66	2.0	2.2	47	185
2010	USA	290	195	67	2.1	2.3	49	195
2015	USA	300	205	68	2.2	2.4	51	205
2020	USA	310	215	69	2.3	2.5	53	215
2025	USA	320	225	70	2.4	2.6	55	225
2030	USA	330	235	71	2.5	2.7	57	235
2035	USA	340	245	72	2.6	2.8	59	245
2040	USA	350	255	73	2.7	2.9	61	255
2045	USA	360	265	74	2.8	3.0	63	265
2050	USA	370	275	74	2.9	3.1	65	275
2055	USA	380	285	75	3.0	3.2	67	285
2060	USA	390	295	76	3.1	3.3	69	295
2065	USA	400	305	76	3.2	3.4	71	305
2070	USA	410	315	77	3.3	3.5	73	315
2075	USA	420	325	77	3.4	3.6	75	325
2080	USA	430	335	78	3.5	3.7	77	335
2085	USA	440	345	78	3.6	3.8	79	345
2090	USA	450	355	79	3.7	3.9	81	355
2095	USA	460	365	79	3.8	4.0	83	365
2100	USA	470	375	80	3.9	4.1	85	375